

**Amendments to the Specification:**

Please replace the paragraph beginning at p. 4, line 5 with the following amended paragraph:

Figure 1 shows a digital communication system 10 employing a trellis coded modulation (TCM) encoder 14. Such a TCM encoder 14 is just one of the many processes that can be modeled as a finite state machine (FSM). Other such processes include, but are not limited to, encoders based on Turbo codes or other codes, near-capacity multi-user detection, near-optimal two-dimensional data detection, fading channels, and inter-symbol interference (ISI) channels. Referring to Figure 1, the digital communication system 10 includes a data source 12 providing symbols defined on a particular closed set of symbols. For example, if a binary closed set of symbols is used, the symbols are selected from {0, 1}. The symbols from the data source 12 are transferred to the TCM encoder 14, which converts the symbols into encoded symbols according to the structure of the TCM encoder 14. The encoded symbols are then sent through a channel 16, which can add noise, such as additive white Gaussian noise (AWGN), and distortions to the encoded symbol to produce an observed signal. Soft information relating to the observed signal is sent to a TCM decoder 18. The TCM decoder 18 outputs soft information regarding the symbols which can be thresholded to produce hard-decision decoded symbols at thresholding block 20. Since the operation of the TCM encoder 14 can be modeled as an FSM, the decoding function of the TCM decoder 18 can be based on the reduced-state soft-input/soft-output (RS-SISO) algorithm according to the invention as discussed below.